REMARKS

I. CLAIM CHANGES

Independent claims 26, 32 and 42 have been amended to limit the vehicle to a vehicle that includes or comprises the image producing device 1, e.g. the camera, and to limit the vehicle to a vehicle that travels on the roads (i.e. a auto or truck). These changes exclude the possibility that the vehicle is an aircraft or satellite that travels above the roads. Basis for these changes is found, for example, on page 13, lines 5 to 12, and in fig. 4 of applicants' originally filed disclosure. Also page 12 and fig. 3 support the changes in the claims.

II. Obviousness Rejection Based on Heimann, et al, and Tanaka

Claims 26 to 28, 30 to 31 and 45 to 48 were rejected as obvious under 35 U.S.C. 103 (a) over Heimann, et al (US Patent 5,948,042), in view of Tanaka (US Patent 6,470,265 – US '265).

Heimann, et al, do disclose a method of continually updating a digital road map employed for traffic direction and guiding vehicles (column 2, lines 15 to 23). The method includes generating road data including providing vehicles with position determining devices (column 5, lines 25 to 30), which travel over the

roads collecting vehicle position data. Route data including attributes for a particular road section associated with vehicle position data is also collected (column 5, lines 53 to 63).

The particular attributes disclosed in Heimann, et al, are the permitted directions of travel over a given road section (one-way streets, etc) and allowed turns at junctions and intersections (see column 2, line 19; line 39; line 49; lines 44 to 47; column 3, lines 20 to 24; column 4, lines 10 to 15; see method claims 1 to 4). These road characteristics or attributes strongly influence the choice of a route through an urban area, where the permitted road directions change over the years, particularly for special vehicles.

Thus Heimann, et al, collect data from road signs placed along a route or road in the method of Heimann, et al, e.g. with an imaging device or camera, because it is the road signs that include information regarding the legally permitted direction of traffic flow, permitted turns, clearance, maximum permitted weight and other legal restrictions (column 2, lines 55 to 60; column 3, lines 51 to 57; column 6, lines 55 to 65). When the data on these road signs changes, the established route must often be changed because it becomes legally blocked, especially for certain special vehicles.

The feature that the collected information from the camera includes at least one of road construction information and cycle lane information in applicants' step d) of amended method claim 26 is **not** disclosed **or** suggested by Heimann, et al. The attributes disclosed in Heimann, et al, do not include road construction information or cycle lane information, only direction of travel

information on the roads or street sections of an existing digital map and/or turning information for existing intersections of an existing digital map.

Heimann, et al, US '042 is not concerned with changes in the number or location, physical structure or size of the roads themselves, because US '042 is **not** concerned with updating an existing digital map with changes in the positions or locations of road and/or street sections, such as the addition of new road and/or street sections since the existing digital map was produced. The attributes are assigned to road and/or street sections of an existing digital map (see column 2, lines 32 to 36).

In contrast, applicants' method includes driving vehicles on road and/or street sections that collect information regarding the presence of new streets due to road construction, physical changes in the size and lane number of existing roads, or the closing of existing streets shown on the existing digital map due to road construction. Alternatively US '042 does not disclose or suggest detecting the presence of cycle lanes on the existing road and/or street sections of the digital map. These limitations are clearly now included in the amended claim 26.

The newly cited Tanaka U.S. Patent does disclose and claim a digital map information collection system comprising an image producing device including means for capturing an image (camera) of the ground surface "from a high point of view" according to claim 1 of US '265. The system of Tanaka also includes means for extracting road network information from the image data captured by the camera according to claim 1 and column 2, lines 25 to 31. According to claim 5 and the abstract of US '265 the image producing device can be part of an earth

satellite. Alternatively a high altitude aircraft could be employed (column 2, lines 47 to 40).

However Tanaka only suggests collecting road construction information and information regarding the physical structure of the roads, such as lane number and size, **from a high point of view** according to their claims. Tanaka suggests that satellite cameras or cameras on high altitude aircraft or an earth satellite provide means to overcome the

> **"problems related to the enormous map making time and cost, very long update intervals.." Column 1, lines 48 to 52, of US '265.**

In other words, Tanaka **leads one skilled in the art away** from collecting road construction information and from updating a digital map of a large road and street system with a group of ground-based motor vehicles, cars and trucks, which are equipped with cameras or any other data collection devices that travel over the road and street system to collect such data because of the enormous amount of data and effort involved. The earth satellite can collect data from a wide area simultaneously.

Furthermore applicants' independent method claims 26 and 32 and independent device claim 42 have now been amended by the above changes to limit the claimed method and device to collecting the road and street data by means of ground-based vehicles that travel on, not above, the road and street system. Note that these claims have been amended to state that the vehicle collecting the information is a vehicle that travels "on", not "over", the road and street system. The former wording using "over" might have been interpreted

broadly as including vehicles that travel above the road and street system. The changes in claims 26, 32, and 42 now exclude collecting data from vehicles that travel above and over the road and street system, like aircraft. The basis for these limitations in the applicants' original disclosure is found e.g. on pages 12 and 13 of the applicants' specification and in figs. 3 and 4.

Many US judicial opinions hold that a prior art reference that would lead one skilled in the art away from a claimed invention should not be combined with other prior art references to reject the claimed invention as obvious under 35 U.S.C. 103 (a). See M.P.E.P. 2145 X. Also the Federal Circuit Court of Appeals has said:

> "That the inventor achieved the claimed invention by doing what those skilled in the art suggested should not be done is a fact strongly probative of nonobviousness." in ***Kloster Speedsteel AB v. Crucible Inc.,*** 230 U.S.P.Q. 81 (Fed. Cir. 1986), on rehearing, 231 U.S.P.Q. 160 (Fed. Cir. 1986).

Tanaka clearly teaches that the way to overcome the enormous data collection problem associated with updating a digital map of a large road and street system for road and street construction additions and changes is to collect the data from a high point of view, namely from an aircraft or earth satellite (column 1, lines 48 to 52; claim 1, column 2, lines 34 and following). This would lead one skilled in the art away from collecting the road construction data and physical structure data for the roads by a group of vehicles equipped with cameras traveling over the road.

The most that these two prior art references suggest to one skilled in the

art would be that vehicles traveling over the road should collect road sign data regarding traffic control information and that aircraft or satellites should collect road construction information and information regarding the physical properties of the roads. They do not suggest that vehicles that travel on the ground and on the roads and streets should collect the road construction information and information regarding the physical structure of the roads, such as lane number and size, and regarding new roads that is required for digital map updating. Otherwise Tanaka would have disclosed that method instead of the method that utilizes an earth satellite or aircraft.

Furthermore the information collection system of Tanaka is deficient and has possible operability problems at least for streets in large cities with tall buildings and complex infrastructure, because it does not collect or misses vital road construction and road related information. Collecting information from a high point of view completely fails to collect information regarding the road structure and construction conditions in tunnels, in the lower levels of two-level bridges (the GW bridge over the Hudson in NYC is an example), and in the lower level on streets in large cites with two levels (An example is under the West side highway in NYC or roads that extend under high bridges). Extensive tree cover by older full-grown trees may make collecting some suburban road construction and physical road data difficult or impossible via airplane or earth satellite.

Furthermore the earth satellite collection system is also limited regarding the effective viewing angle that is required to take a picture. If an angle is required to view a sign, which is nearly parallel to the surface of the earth, the

collection of data from the sign via earth satellite is likely to be impossible. It may also be impossible to view most streets with an earth satellite (which usually travel around the earth in circumpolar routes) when the streets extend through a group of large tall buildings as in NYC. As anyone who has ascended to a tall building observation deck or passed over Manhattan in an airplane would know, it is possible to view only a very small fraction of the street areas from a single high view point or if one travels along a single course. Viewing of most of the street level areas "from a high viewpoint" is blocked by the presence of the tall buildings. The system would have similar problems with the urban centers of most of the major US cities.

In addition, it would be easy to implement applicants' system in a large urban environment with tall buildings. It would only be necessary to equip public vehicles, such as taxis, buses and police cars, with automatic data collection systems including the image producing device. This contrasts to launching an earth satellite that has an appropriate camera and control software, which would seem to involve a considerably greater effort and expense.

Thus applicants' road and street data collection system is **different from and better than** the road and street data collection system suggested by a combination of Heimann, et al, and Tanaka, at least for large urban areas with large, tall buildings. The prior art system suggested by the references comprises a group of vehicles traveling over the roads to collect information from traffic signs and an aircraft or earth satellite to collect physical information regarding the structure of the roads, such as lane size and lane information, and the addition of

new streets and street changes by road construction. According to the applicants' amended claims the road construction information is collected by vehicles traveling on the ground and on the roads, not high above the road system in the air or in space. The applicants' system is better because it is more thorough. It can collect all the road construction information, even from roadways that are located in a lower level below other roadways, also in tunnels and at street level in urban areas with tall buildings.

For the foregoing reasons and because of the changes in claims 26, withdrawal of the rejection of claims 26 to 28, 30 to 31 and 45 to 48 as obvious under 35 U.S.C. 103 (a) over Heimann, et al (U.S. Patent 5,948,042), in view of Tanaka, US Patent 6,470,265, is respectfully requested.

III. Obviousness Rejection based on Heimann, et al, Tanaka and Kawai

Claims 29, 32 to 44, and 49 to 50 were rejected as obvious under 35 U.S.C. 103 (a) over Heimann, et al, U.S. Patent 5,948,042, in view of Tanaka, US Patent 6,470,265, and further in view of Kawai, et al, U.S. Patent 6,577,334.

Heimann, et al, and Tanaka have been described above. The combination of these two prior art references does not suggest the important limitations of independent method claim 32 and independent device claim 42. The same observations regarding what these two prior art references suggest to one of ordinary skill in the art, which were made in the above section II, are applicable here in section III. Tanaka does **not** suggest that the vehicles of Heimann, et al,

which include cameras to collect road sign information and information regarding traffic guidance rules should also collect information regarding the construction of new roads and changes in the physical structure of existing roads, for example changes due to road construction. The combination of Tanaka and Heimann, et al, only suggests that the information regarding road construction and physical structure of existing roads, such as lane number and size, should be collected "from a high view point", e.g. by means of an aircraft or earth satellite and that the information from the traffic signs regarding traffic flow control regulations should be collected by vehicles traveling over the roads with cameras.

The amended independent claims 32 and 42 have now been limited to vehicles that collect road and street information by traveling on the ground and on the roads and streets, not above the road system in aircraft or the like, as noted above for claim 26 in section II. The basis for these limitations in the applicants' original disclosure is found e.g. on pages 12 and 13 of the applicants' specification and in figs. 3 and 4.

Also regarding amended method claim 32 Heimann, et al, does not disclose or suggest that the collected information from the camera includes all of the following information: road construction information, cycle lane information a course of the at least one road or street section (8) relative to the vehicle (7), a spacing (10) between a vehicle longitudinal axis (L) and a street or road edge (E), a width (12) of the at least one street or road section (8), a number of lanes (9) on the at least one road or street section (8), a width (11) of a lane (9) in which the vehicle (7) travels and a curvature of the at least one street and road

section (8). Much of the foregoing information regarding the physical dimensions and structure of the roads and streets changes when road construction takes place. Heimann, et al, is unconcerned with road construction or physical changes in the roads. The same can be said of the similar limitations in claim 42.

Kawai, et al, disclose a vehicle travel control system including a computer data processing unit with a memory coupled to various vehicle internal sensors including an acceleration sensor, brake sensor, and speed sensor and external sensors including a GPS position sensor, distance sensor, gyro-magnetic sensor, and camera (abstract, fig. 1 and associated description in column 5 and following).

The vehicle control system of Kawai, et al, does include a camera for obtaining road and/or street data from the surroundings. Specifically, the camera in Kawai, et al, takes a picture of the road in front of the vehicle and the image data is analyzed to determine the distance of the vehicle from the lines that demark the lane that vehicle is traveling or other lines on the road (column 1, line 62, to column 2, line 26 and column 9, lines 15 to 40). Also a laser distance measuring device or radar is employed to determine the distance and speed of obstacles, such as other vehicles (column 9, lines 40 to 51). According to a simplified description here in these REMARKS, the vehicle control means (computer) receives the information from the camera and obstacle/distance measuring devices and sends out control signals to the various parts of the vehicle to control its position in the lane during travel on the road.

However Kawai, et al, like Heinmann, et al, does not disclose using the

road and street data collected to update an existing digital map, especially for changes in the physical structure of existing roads. Kawai, et al, is primarily concerned with a method for automatic control of vehicle travel using GPS navigation system and the guidance that can be provided by an existing digital map that is stored in memory of the navigation system..

Kawai, et al, does not disclose or suggest a device or method for collecting data regarding road construction and/or cycle information. For that reason Kawai, et al, does not disclose or suggest the modifications of the prior art as disclosed by Heinmann, et al, and Tanaka, et al, that will lead to the invention, as it is now claimed in *amended* device claims 42 to 44 or dependent method claims 29 and 32 to 41.

Particularly Kawai, et al, do not suggest a method of producing road and street data in which data collecting vehicles travel **on** a system of roads and/or streets (i.e. autos or trucks) collecting data regarding road construction of new roads and repairs to existing roads with cameras mounted on the vehicles, as claimed in the amended claim 32. None of the other references suggest these latter limitations; Tanaka only suggests collecting this data with an aircraft or earth satellite. This latter source of data is excluded from claim 32 because the vehicles collecting the data must travel on the ground.

Particularly Kawai, et al, also do not suggest a device for producing road and street data in which data collecting vehicles travel **on** a system of roads and/or streets (i.e. autos or trucks) collecting data regarding road construction of new roads and repairs to existing roads with cameras mounted on the vehicles,

as claimed in the amended device claim 42. Tanaka only suggests collecting this data with an aircraft or earth satellite. This latter source of data is excluded from claim 42 because the vehicles collecting the data must travel **on** the roads or streets.

For the foregoing reasons and because of the changes in amended independent claims 32 and 42, withdrawal of the rejection of claims 29, 32 to 44 and 49 to 50 as obvious under 35 U.S.C. 103 (a) over Heimann, et al, U.S. Patent 5,948,042, in view of Tanaka, US Patent 6,470,265, and further in view of Kawai, et al, U.S. Patent 6,577,334 is respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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